



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,720	02/19/2004	Jack T. Oldham	1684-6036US (484-28684-US)	7639
24247	7590	04/20/2006	EXAMINER	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			BOMAR, THOMAS S	
			ART UNIT	PAPER NUMBER

3672

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/783,720

Applicant(s)

OLDHAM ET AL.

Examiner

Shane Bomar

Art Unit

3672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-188 is/are pending in the application.
- 4a) Of the above claim(s) 75-178, 187 and 188 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-37, 39-74 and 179-186 is/are rejected.
- 7) ☒ Claim(s) 38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/19/04, 6/27/05, 8/24/05, 2/6/06

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-74 and 179-186, in the reply filed on February 6, 2006 is acknowledged.

Claim Objections

2. Claims 14 and 26 are objected to because of the following informalities: in line 4 of claim 14, the two recitations of "a" should be changed to --the--; the recitation of "the at least one superabrasive cutter" lacks proper antecedent basis in claim 1. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
- (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, 8-23, 27-29, 32-37, 39-44, 46-50, 57-60, 63, 64, 69-74, and 179-186 are rejected under 35 U.S.C. 102(a) as being anticipated by paper # WOCD-0306-05 to McKay et al (paper #1) and paper # WOCD-0306-02 to Galloway (paper #2). Both papers were presented at the same conference and are directly related to one another.

Paper #1 discloses three types of casing bits, the DS 1, DS 2, and DS 3, wherein each bit has an inner profile, an outer profile, and a nose portion; at least one aperture formed in the nose

Art Unit: 3672

portion of the casing bit and configured for delivering drilling fluid from an interior of the casing bit to an exterior thereof; a plurality of generally radially extending blades, or discrete cutting element retention structures, disposed on the nose portion, wherein at least one of the plurality of blades carries one or more cutting elements affixed thereto; and at least one gage section, the at least one gage section extending longitudinally from adjacent the nose portion of the casing bit (see Figs. 1-3, the Introduction, and the Background). Paper #2 goes on to provide further disclosure for the DS 3 bit embodiment.

Therefore, each of the three bits anticipates claims 1-4, 8, 9, 27, 28, 34, 35, 72, 74, and 179-184.

The DS 1 and DS 2 embodiments further disclose the following:

- Regarding claims 10 and 11, it is clear from Figure 2 in paper #1 that DS 2 has an inverted cone geometry, therefore, when a subsequent DS 2 bit is used to drill through the first bit, the outer profile of the second DS 2 will correspond to the inner profile of the first DS 2.
- Regarding claims 29, 32, and 33, the exterior of the bit is coated (see the second paragraph in the Background of paper #1).
- Regarding claims 36 and 37, Figures 2 and 3 of paper #1 show grooves behind the cutting elements on the blades.
- Regarding claims 185 and 186, as is notoriously known in the art, the inserts in the casing bit will act as percussive bits with any up and down motion experienced by the casing, which could happen if the bit were to encounter

material that makes it bounce, or if the string experienced a sticking situation and had to be slid up and down within the hole.

The DS 3 embodiment further discloses the following:

- Regarding claims 10 and 11, it is clear from Figures 3-6 in paper #1 that DS 3 has an inverted cone geometry, therefore, when a subsequent DS 3 bit is used to drill through the first bit, the outer profile of the second DS 3 will correspond to the inner profile of the first DS 3.
- Regarding claims 12 and 13, the DS 3 is configured to fail in response to the inner assembly being forced out through the nose, which leaves a large opening through which cement may flow (see Figs. 8, 9, and 12 of paper #1).
- Regarding claims 14 and 15, it can be seen in Figure 4 of paper #1 that the area where the blades are to flex when they are pushed outward by the inner core is thinner than the area in the middle of the nose where the blades converge. This configuration is the same as those shown in the drawings by the Applicant, and will therefore exhibit the same properties being claimed.
- Regarding claims 36 and 37, Figures 2 and 3 of paper #1 show grooves behind the cutting elements on the blades.
- Regarding claims 16-23, 46, 48, and 50, paper #2 goes on to further show that a first type of cutter element is used in the drillable region while a second type of cutter element is used in the region that is not to be drilled (see the DrillShoe tools section and Fig. 3), wherein the first cutters in the drillable region are small

enough to be embedded in the cutting matrix, while the non-drillable cutters are larger, and the cutting elements are brazed onto the bit.

- Regarding claims 39-44, paper #2 shows replaceable nozzles with tungsten carbide on them (see Figs. 5 and 6, and the 4th paragraph of the DrillShoe tools section).
- Regarding claims 47 and 49, brazing acts as a form of adhesive, although US patent 6,655,481 provides specific evidence for affixing cutter elements with adhesive.
- Regarding claims 57-60, the upper end of the cutting elements comprises the cutter face while the lower end resides in a recess in the blade (see, for example, Fig. 4 in paper #2, and Fig. 3 in paper #1).
- Regarding claims 63 and 64, close analysis of Figure 9 of paper #1 shows grooves in the back of the blades in a similar configuration as that of the Applicant.
- Regarding claims 69-71, the bit has an inner core and an outer shell (see Fig. 6 and the description in paper #1).
- Regarding claim 73, the drillable casing bit includes an abrasive structure that makes it more drillable (see the second paragraph of the DrillShoe Tools section in paper #2).
- Regarding claims 185 and 186, as is notoriously known in the art, the inserts in the casing bit will act as percussive bits with any up and down motion experienced by the casing, which could happen if the bit were to encounter

material that makes it bounce, or if the string experienced a sticking situation and had to be slid up and down within the hole.

- Regarding claims 185 and 186, as is notoriously known in the art, the inserts in the casing bit will act as percussive bits with any up and down motion experienced by the casing, which could happen if the bit were to encounter material that makes it bounce, or if the string experienced a sticking situation and had to be slid up and down within the hole.

5. Claims 1, 2, 4-9, and 179-186 are rejected under 35 U.S.C. 102(b) as being anticipated by US patent 6,062,326 to Strong et al.

Regarding claims 1, 2, 4, 8, 9, and 179-184, Strong et al disclose a casing bit that has an inner profile, an outer profile, and a nose portion; at least one aperture 52 formed in the nose portion of the casing bit and configured for delivering drilling fluid from an interior of the casing bit to an exterior thereof; a plurality of generally radially extending blades 42, or discrete cutting element retention structures, disposed on the nose portion, wherein at least one of the plurality of blades carries one or more cutting elements affixed thereto; and at least one gage section 46, the at least one gage section extending longitudinally from adjacent the nose portion of the casing bit (see Figs. 3-5).

Regarding claims 5-7, the cutters 44, which engage the bottom region of the borehole first, are tungsten carbide while the cutters 48, which subsequently engage the wall region of the borehole, are PDC (see col. 4, lines 1-31).

Regarding claims 185 and 186, as is notoriously known in the art, the inserts in the casing bit will act as percussive bits with any up and down motion experienced by the casing, which could happen if the bit were to encounter material that makes it bounce, or if the string experienced a sticking situation and had to be slid up and down within the hole.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKay et al (papers from above) in view of US patent 6,460,631 to Dykstra et al.

While McKay et al teaches the casing bit of claim 1 with cutter inserts, some being made of PDC, it is not explicitly taught that there are wear knots and bearing regions to limit the depth of cut of the bit.

Dykstra et al teach that it is well known for bits with PDC cutter inserts to overload and have too great of a depth of cut (see col. 1, lines 42-52). Therefore, it is taught to add wear knots and bearing areas to the blades of bits with PDC cutters to limit the depth of cut and prevent the overloading noted in prior art PDC cutters (see col. 3, lines 24-33 and col. 6, lines 21-40). It would have been obvious to one of ordinary skill in the art, having the teachings of McKay et al and Dykstra et al before him at the time the invention was made, to modify the blade structure taught by McKay et al to include the wear knots and bearing surfaces of Dykstra et al, in order to

Art Unit: 3672

obtain an improved bit. One would have been motivated to make this combination because Dykstra et al have shown that providing said elements to bits with PDC inserts will improve performance of the bit and reduce overloading.

Dykstra et al can analogously be applied to Strong et al's casing shoe to provide wear knots and/or a bearing surface on the blades of the shoe for the purposes taught by Dykstra et al.

8. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKay et al in view of US PGPub 20050145417 to Radford et al.

While McKay et al teaches the casing bit of claim 1 with a coating on the exterior, it is not explicitly taught that the coating is a polymer for inhibiting adhesion of the cuttings on the bit.

Radford et al teach that polymers are used to coat the exterior of downhole bits for the purpose of limiting the adhesion of the cutting sin the drilling fluid with the exterior of the bit. It would have been obvious to one of ordinary skill in the art, having the teachings of McKay et al and Radford et al before him at the time the invention was made, to modify the casing bit taught by McKay et al to include the coating of Radford et al, in order to obtain an improved casing bit. One would have been motivated to make such a combination because the limited accumulation of cuttings on the bit will improve the performance.

Radford et al can analogously be applied to Strong et al's casing shoe to provide a coating on the exterior of the shoe for the purposes taught by Radford et al.

9. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over McKay et al in view of US patent 6,439,326 to Huang et al.

McKay et al teach the casing bit of claim 1 that includes a nose portion, although it is not explicitly taught that the nose portion also includes a rolling cone.

Huang et al teach that it is known to combine fixed, bladed cutters with roller cones to obtain a bit that a) can ensure that the gage of the bore will be maintained throughout the life of the bit, b) has a prolonged life, equating to fewer trips into and out of the wellbore, and c) can also perform underreaming functions (see col. 2, lines 58-63 and col. 7, lines 14-30). Therefore, it would have been obvious to one of ordinary skill in the art, having the teachings of McKay et al and Huang et al before him at the time the invention was made, to modify the casing bit taught by McKay et al to include the additional rolling cone configuration of Huang et al, in order to obtain a bit that can perform the functions shown above. One would have been motivated to make such a combination since Huang et al have shown it to be advantageous to add a rolling cone to a fixed-type cutter for prolonged bit life and wellbore gage maintenance.

Huang et al can analogously be applied to Strong et al's casing shoe to provide a rolling cone on the exterior of the shoe for the purposes taught by Huang et al.

10. Claims 51-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKay et al in view of US patent 6,620,308 to Gilbert.

While McKay et al teach that the cutting elements of claims 1 and 46 are brazed to the blades, the blades being a substrate, it is not explicitly taught that an electrically disbonding material is used to affix the cutting elements to the blades.

Gilbert teaches the use of an electrically disbonding material to bond a material to a substrate so that the material can be removed from the substrate without damage to the substrate (see col. 2, lines 29-54). It would have been obvious to one of ordinary skill in the art, having

Art Unit: 3672

the teachings of McKay et al and Gilbert before him at the time the invention was made, to modify the means for attaching the cutting elements to the blades taught by McKay et al to include the electrically disbonding material of Gilbert, in order to obtain an adhesive that can be strong, yet temporary, and will not damage the substrate. One would have been motivated to make such a combination since Gilbert's bonding material is for use in temporary bonding applications where a strong bond is required, which will be beneficial to McKay since it is taught that the cutters must be capable of drilling through specific formations, while maintaining the ability to be drilled out without excessive wear to the cutters of the subsequent drilling device. Therefore, if the cutters could be simply removed from the substrate, then they would pose less of a drilling hindrance to the drill-though bit.

Gilbert can analogously be applied to Strong et al's casing shoe to provide an improved bonding between the cutting elements and the substrate for the purposes taught by Gilbert.

11. Claims 55 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKay et al.

McKay et al do not explicitly teach that the cutting elements of claims 1 and 46 are attached to the blades by fastening elements extending therethrough. However, the Applicant admits in the last 4 lines paragraph [00129] that such fasteners are well known in the art, so it therefore would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use such fasteners with the McKay et al casing bit. Furthermore, since the Applicant has claimed the use of at least four different ways, or means, for affixing the cutting elements to the blades, the means by which the cutting elements are attached does not appear to be a critical element of the Applicant's invention.

The same rejection and reasoning can analogously be applied to Strong et al's casing shoe.

12. Claims 61 and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKay et al in view of US patent 4,956,238 to Griffin.

While McKay et al teach that the cutting elements of claims 1 and 46 are affixed to the blades by an unspecified brazing material, it is not explicitly taught that the braze material exhibits a liquidus temperature of, at most, about 1305 degrees.

Griffin teaches the use of specific brazing materials that fall within the liquidus temperature range being claimed (see, for example, Table 1). At the time the invention was made, it would have been obvious to one of ordinary skill in the art to use the specific brazing material of Griffin for the cutting elements of McKay et al so that an improved high strength, low bonding temperature braze will attach the cutter to the blade. One would have been motivated to use this braze because McKay et al are not specific in what type to use, and because Griffin provides a known braze material with improved characteristics over prior braze materials.

The same rejection and reasoning can analogously be applied to Strong et al's casing shoe.

13. Claims 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over McKay et al in view of US patent 6,063,502 to Sue et al.

While McKay et al teach the casing bit of claim 1 is made of certain materials, it is not explicitly taught that the bit also comprises fibers in a matrix material.

Sue et al teach the use of circumferentially and concentrically oriented fibers in a matrix material in wellbore drill bits to improve the fracture toughness of the bit (see col. 2, lines 14-27

and Figs. 3-11). It would have been obvious to one of ordinary skill in the art, having the teachings of McKay et al and Sue et al before him at the time the invention was made, to modify the casing bit taught by McKay et al to include the fiber reinforcement of Sue et al, in order to obtain a bit with improved fracture toughness over prior art bits. One would have been motivated to make this combination because the continuous binder phase increase the overall fracture toughness by blunting or deflecting the tip of a crack (see col. 2, lines 42-51 of Sue et al).

The same rejection and reasoning can analogously be applied to Strong et al's casing shoe.

14. Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over McKay et al in view of US PGPub 20040245020 to Giroux et al.

While McKay et al teach the general use of the casing bit of claim 1, it is not expressly taught that at least one sensor is used for measuring a condition of drilling, a condition of the casing bit, or a formation characteristic.

Giroux et al teach a casing bit similar to that of McKay et al, with the additional teaching of sensors that sense conditions in the wellbore (see paragraph [0238]). Since sensors are notoriously known in the art for use in sensing downhole conditions, and since Giroux et al have shown the specific use of sensors with casing-while-drilling applications, it would have been obvious to one of ordinary skill in the art to, at the time the invention was made, use the sensors of Giroux et al on the McKay et al casing bit.

The same rejection and reasoning can analogously be applied to Strong et al's casing shoe.

Allowable Subject Matter

15. Claim 38 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Haugen et al and Slaughter et al teach roller cones and fixed blades on the same bit. Findley et al provide evidence for adhesive bonding for cutter elements to a substrate. Stjernstrom et al teach percussive and rotary drilling with casing.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane Bomar whose telephone number is 571-272-7026. The examiner can normally be reached on Monday - Thursday from 6:30am to 4:00pm. The examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Bagnell can be reached on 571-272-6999. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 3672

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



David J. Bagnell
Supervisory Patent Examiner
Art Unit 3672

tsb
April 17, 2006